

IN THE SPECIFICATION:

Please amend the specification, as follows.

In paragraph [0001]:

- - This is a continuation of application Ser. No. 09/979,822, filed November 26, 2001 and now U.S. Pat. No. [[]]6,740,442, which is a 371 application of PCT/JP99/02897 filed May 31, 1999. - -

In paragraph [0015]:

- - In addition, since both the separator and the electrolyte are films, for example, thin films each having a thickness of [[a]]several [[ten]]tens of micron, the power losses caused due to the internal resistance of these films can be reduced. As a result, the power generation performance can be improved. Additionally, since the separator is formed of a film, a quantity of an expensive separator material to be used can be decreased. - -

In paragraph [0039]:

- - In addition, since the fuel electrode is composed of a porous substrate in this embodiment, the strength of the single cell 1 can be assured by these fuel electrodes themselves. Therefore, although an electrolyte and a separator must be plate materials having a certain degree of thickness in order to assure the strength of the single cell 1 in the prior art, the electrolyte and the separator can take the form of films. For example, a film thickness of each of an electrolyte film 3 and a separator film 5 is approximately several [[ten]]tens of μm . Thus, power losses in the electrolyte film 3 and the separator film 5 can be prevented, and the power generation performance of the flat plate type SOFC can

be improved. - -

In paragraph [0048]:

- - The separator film 5 has a thickness which is substantially the same as that of the electrolyte film 3, i.e., a film thickness of approximately several [[ten]]tens of μm . Therefore, electrical losses in the separator film 5 can be prevented, and the power generation performance of the flat plate type SOFC can be improved. In addition, a quantity of a material required for the separator film 5 can be greatly reduced as compared with the case where the conventional separator plate is used, and the manufacturing cost can be hence decreased by reducing the expensive separator material. Although the separator film 5 is formed of a film of ceramics such as lanthanum chromite in this embodiment, the present invention is not restricted thereto, and a known or new material which can be used for the separator film 5 may be utilized. In such a case, electrical losses in the separator film 5 can be also prevented, and the power generation performance of the flat plate type SOFC can be improved. - -

In paragraph [0059]:

- - Additionally, the stack 14 includes the laminated body 10, and the ceramics manifold plate 11 which surrounds the side portions of the laminated body 10 and distributes the fuel gas and air to the respective electrode porous substrates 2 and 6. Here, although FIG. 1 is given as if the spaces between the manifold plate 11 and the porous fuel electrode substrate 2, and the manifold plate 11 and the porous air electrode substrate 6 are partially opened, a thickness of each film is actually several [[ten]]tens of μm . Further,

since the manifold plate 11 is pressed against the laminated body 10, the manifold plate 11 and the porous fuel electrode substrate 2, and the manifold plate 11 and the porous air electrode substrate 6 are closely pressed against each other with no space provided therebetween. Accordingly, gas does not leak from the space between the manifold plate 11 and the laminated body 10. - -

In paragraph [0065]:

- - The manufacturing procedure of the flat plate type SOFC having the above-described stack 14 will now be described hereinafter. When manufacturing the porous fuel electrode substrate 2, nickel oxide and YSZ are mixed and, for example, a molding agent such as methyl cellulose or poly vinyl alcohol is then added. Thereafter, press molding is carried out. Alternatively, the mixed material of nickel oxide, YSZ and the molding agent is made clayey and extruded. Subsequently, the obtained molding is sintered at approximately 1400 [°C], thereby forming the porous fuel electrode substrate 2. Here, manufacturing conditions such as the strength of pressing or extrusion pressure or the sintering temperature are set in such a manner that the formed porous fuel electrode substrate 2 can have the porosity such that the fuel gas can be easily passed and the necessary mechanical strength for the signal cell 1 can be provided. Here, if the mechanical strength is set lower than that of a solid matter consisting of a material of the porous fuel electrode substrate, the thermal stress during the power generation operation of the stack 14 can be absorbed and alleviated, and the strength of the stack 14 can be hence enhanced. - -

In paragraph [0066]:

- - As shown in FIG. 2, the electrolyte film 3 is formed to the thus obtained porous fuel electrode substrate 2. Moreover, the separator film 5 is formed to the porous fuel electrode substrate 2, as shown in FIG. 3. As a method for forming the electrolyte film 3 and the separator film 5, any of a wet process, a slurry coating method, a coating thermal decomposition method, a sol-gel process and the like which are well known can be used, and the present invention is not restricted specific method. A film having a thickness of several tens of μm can be formed by any method. In addition, for example, the films can be manufactured by a simultaneous sintering method by which an unbaked film produced by a tape cast method is attached to the unbaked porous fuel electrode substrate 2 and they are then simultaneously sintered. In such a case, since the number of times of heat treatment can be reduced, the manufacturing cost can be lowered. - -

In paragraph [0068]:

- - Further, in case of manufacturing the porous air electrode substrate 6, a molding agent such as methyl cellulose or poly vinyl alcohol is added to lanthanum strontium manganite, and press molding or extrusion is effected as similar to the porous fuel electrode substrate 2. Thereafter, the obtained molding material is baked at approximately 1100 to 1200 $^{\circ}\text{C}$. At this moment, the formed porous air electrode substrate 6 is set in such a manner that it can have the porosity such that air can be easily passed and the necessary mechanical strength for the single cell 1 can be provided. Here, a sintering temperature (1100 to 1200 $^{\circ}\text{C}$) of the porous air electrode substrate 6 is lower than the sintering temperature (1400 $^{\circ}\text{C}$) of the porous fuel electrode substrate 2.

Therefore, the porous air electrode substrate 6 has the mechanical strength lower than that of the porous fuel electrode substrate 2 and the deforming property. As a result, the stress generated inside the stack 14 due to the thermal stress or the external force during power generation can be absorbed by deformation of the porous air electrode substrate 6, thereby preventing destruction. - -

In paragraph [0070]:

- - Furthermore, as shown in FIG. 6, the two manifold plates 11, 11 which do not have the fuel gas flow opening 12 and the air flow opening 13 are brought into contact with each other and bundled on a pair of side surfaces positioned on the opposed sides of the laminated body 10. In this state, the heat treatment of approximately 1100 [°C] is effected. By this heat treatment, the laminated body 10 and the manifold plates 11 are welded and jointed to each other, and the porous air electrode substrate 6 and the separator film 5 can be also jointed to each other. - -